



2nd MEDITERRANEAN WATER FORUM



Panel 2 « Nexus Water / Energy / Food Security »

Nexus Water / Energy / Food Security in irrigation sector

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- *Federación Nacional de Comunidades de Regantes de España (FENACORE)*
- *Euromediterranean Irrigators Community (EIC)*

Euromediterranean Irrigators Community (EIC)

- ❖ EIC is an international association of water users associations and federations of irrigators from the following countries: Portugal (Fenareg), Francia, Italia, Alemania, Grecia, Turquía (Sulama), Egipto, Túnez, Marruecos y España (Fenacore)

- ❖ **MAIN OBJETIVES**

- ✓ To represent the members and the European irrigation at the European Union and its Institutions
- ✓ To represent the members before International Organizations and Associations related to agriculture, water and irrigation.
- ✓ Exchange ideas, projects and experiences to improve institutional organization of irrigation in member countries.
- ✓ To favour the information exchange on irrigation

Evolution of Irrigation Systems in Spain.

IRRIGATION SYSTEM	Before 2000		2013 year	
	Hectares	%	Hectares	%
Flooding (gravity)	1.973.336	59	1.004.782	28
Sprinkling and others	802.712	24	828.202	23
Dripping	568.588	17	1.707.576	48
TOTAL	3.344.636	100	3.540.560	100

Source: PNR 2001 y encuesta sobre superficies y rendimientos de cultivo 2013

Irrigation systems in the Mediterranean area

Country	IRRIGATION		IRRIGATION SYSTEM (%)		
	Irrigable area	Irrigated Area	Flooding	Sprinkler	Dripping
Algeria		260.000		15%	
Egypt		3.422.178	88%	5%	7%
France	2.723.700	1.938.730			
Germany	600.000	560.000	0%	98%	2%
Greece	1.321.340	1.161.000			
Italy	3.892.202	2.471.379			
Libia		375.000			
Maroc		1.484.160	80%	10%	10%
Portugal	792.000	600.000	30%	38%	32%
Spain	3.700.000	3.473.473	28%	23%	48%
Turkey	25.853.674	4.300.000	80%	10%	10%

Source: FAO, German associations, Ministry of Water Resources Libia, Ministère des Ressources en Eau Algeria, FENAREG, CIHEAM, MAGRAMA

Irrigation system in the world

COUNTRY	TOTAL IRRIGATION HA*	DRIPPING IRRIGATION HA*	DRIPPING IRRIGATION %
World	331		< 6%
USA	22,9	1,7	7,4%
India	65	2	3,1%
China	63	0,756	1,2%
Israel	0,225	0,169	75,1%
Argentina	1,355	0,127	9,4%
México	6,5	0,143	2,3%
Spain	3,54	1,7	48%

* In Million ha

Source: FAO 2006,2007,2008,2009; ICID 2012; USDA 2005

Irrigation in Europe

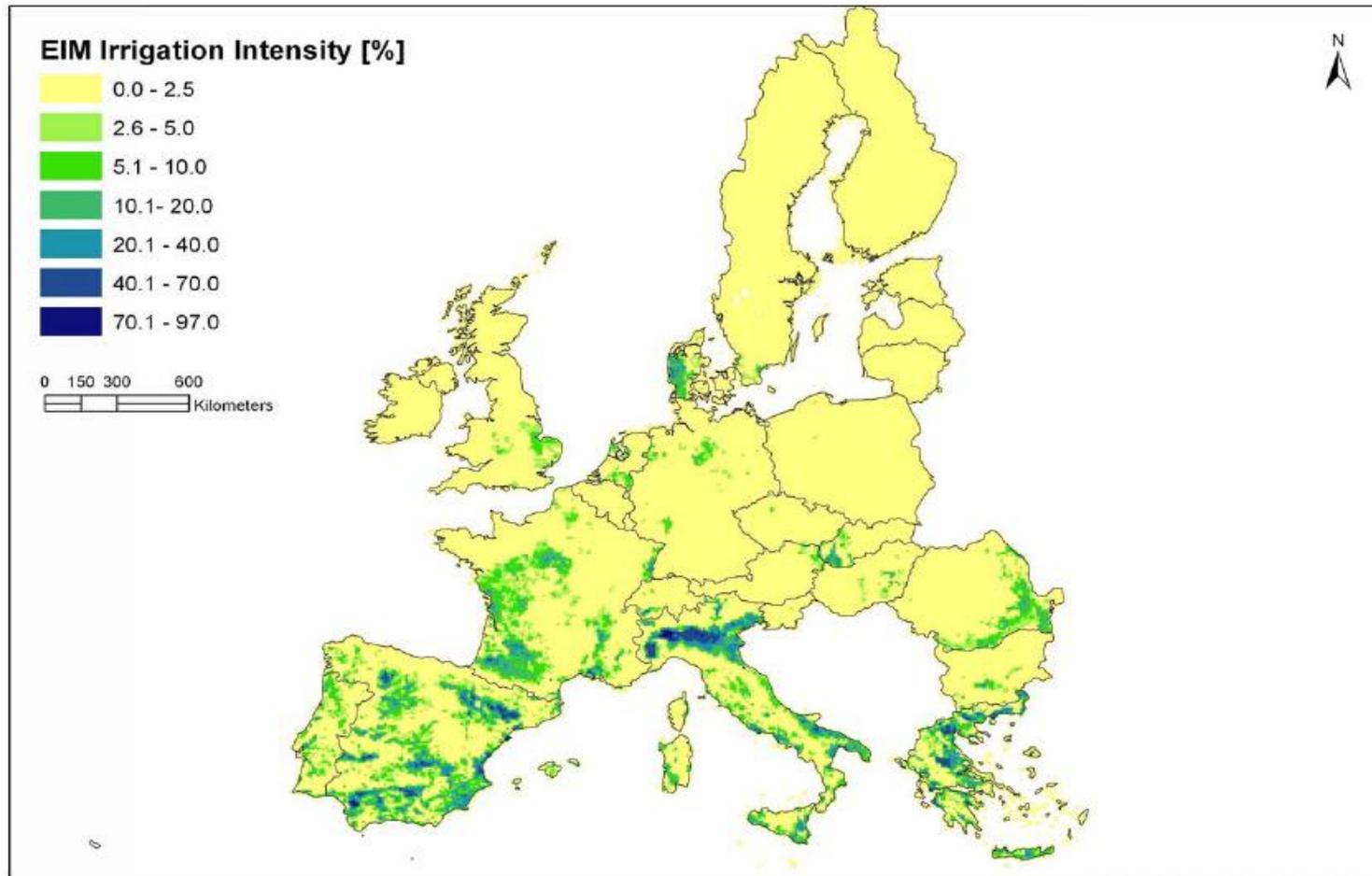
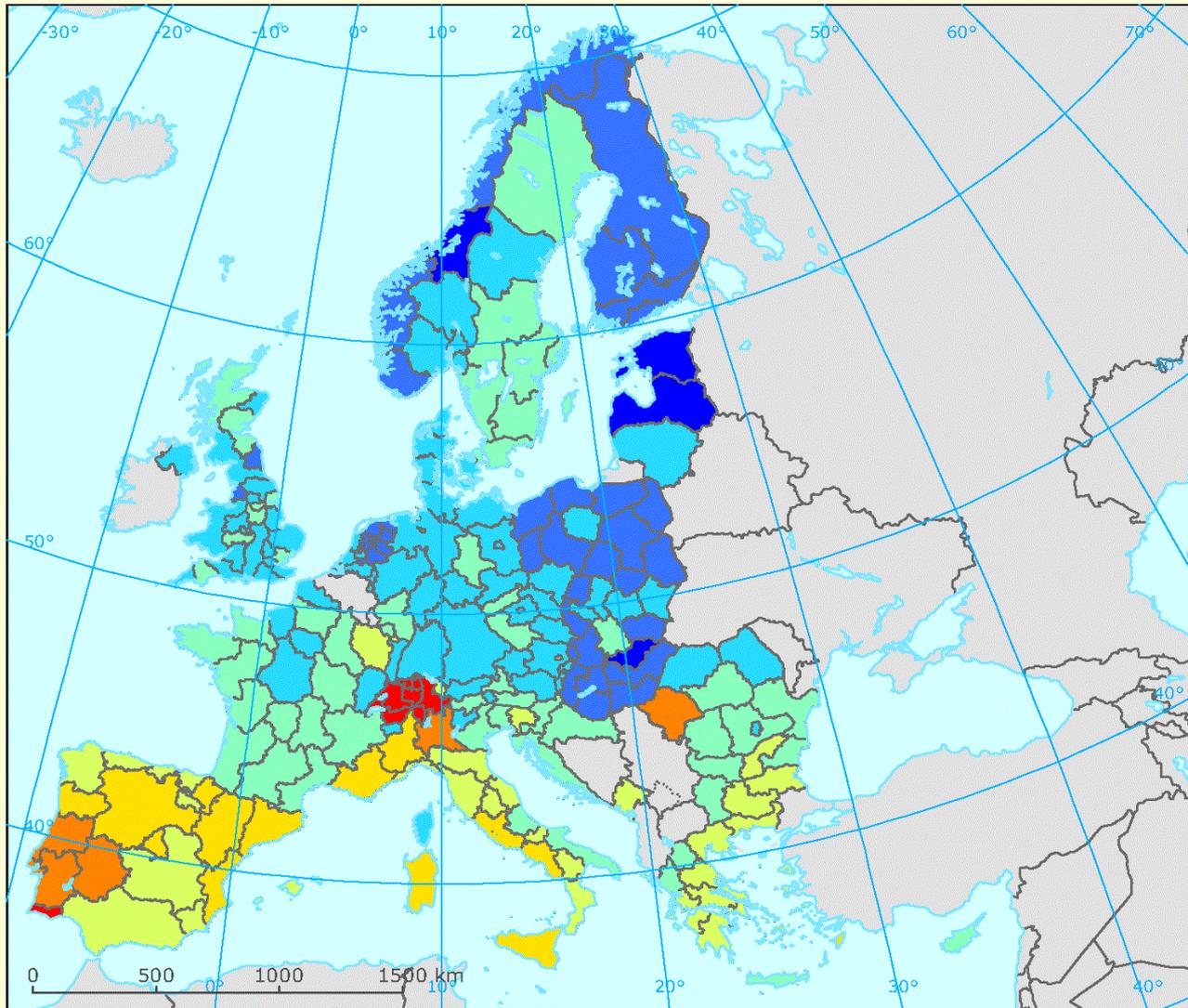


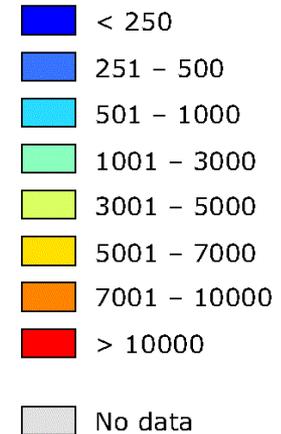
Figure 5: European Irrigation Map (EIM) - Irrigation intensity in the EU as irrigated area in % of total area calculated over a 10x10km raster. NB: the regions shown are at the NUTS 2 level.

Water irrigation use in Europe



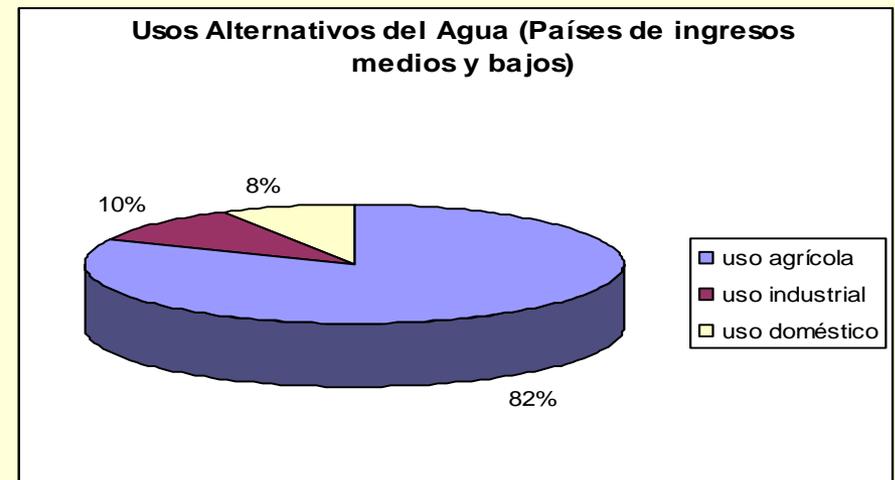
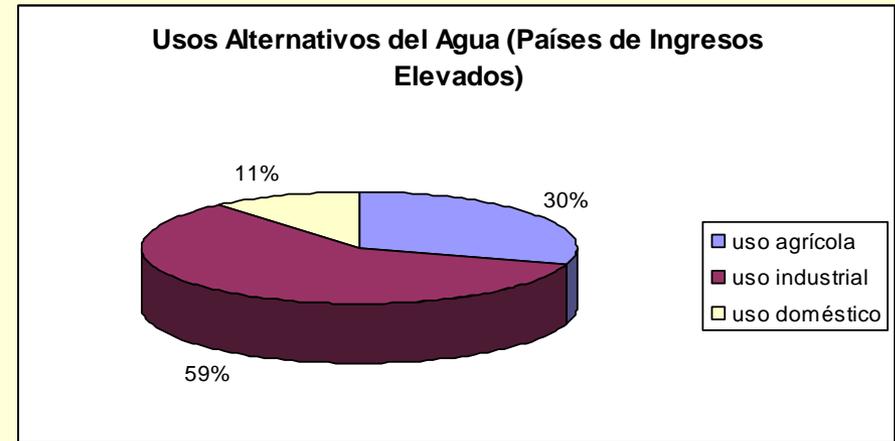
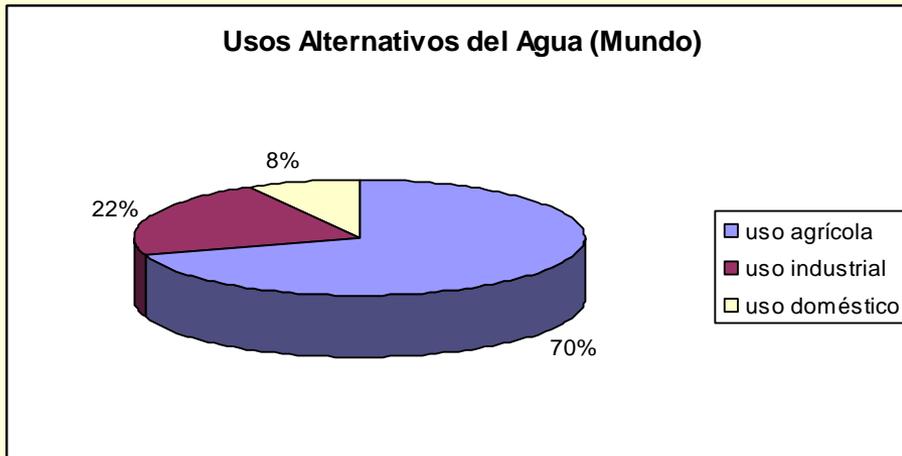
Water Used for Irrigation in Europe per NUTS2 Regions

m³/ha



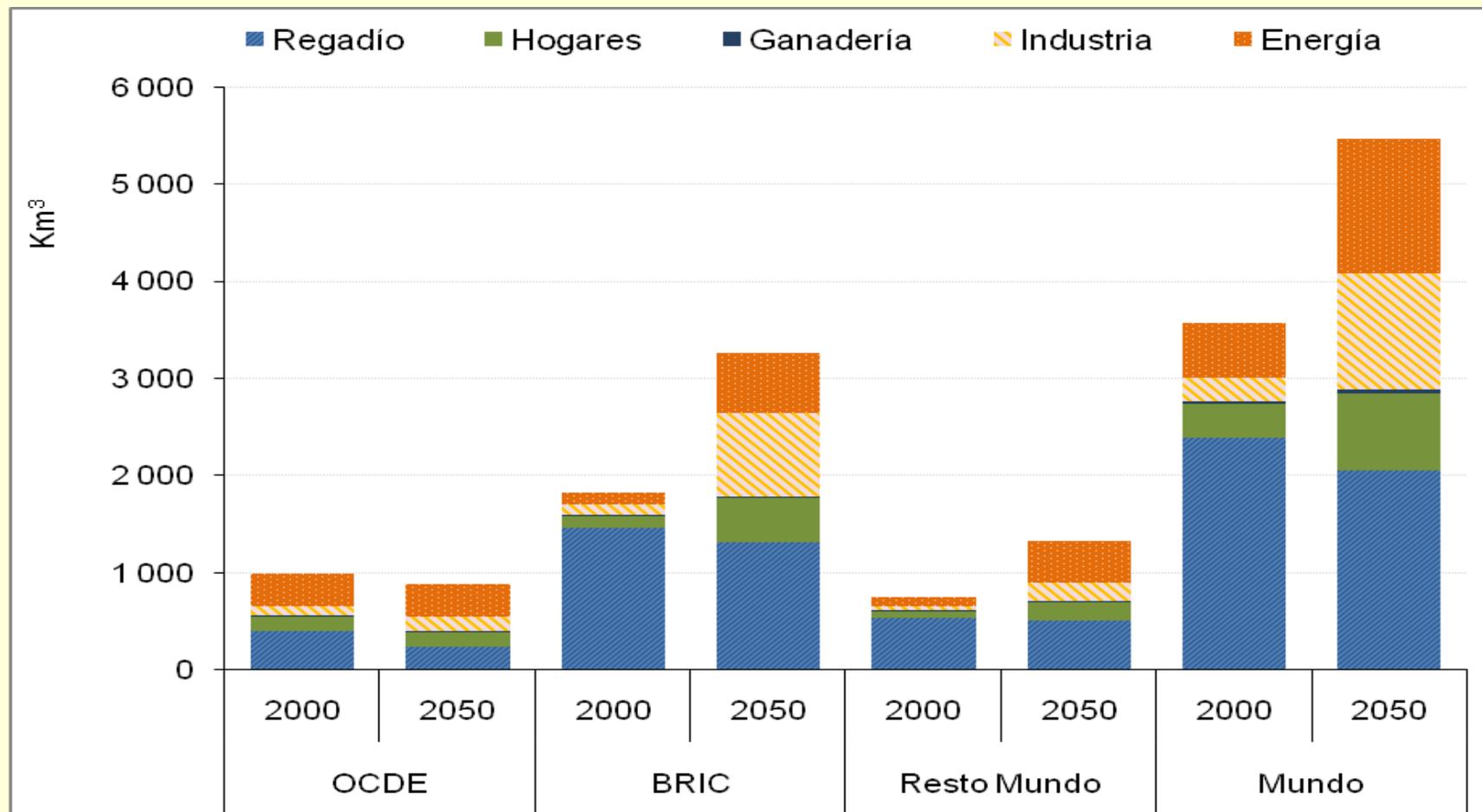
Fuente:
European Environment
Agency

Water uses in the world



source: "Water for people, water for life". UNESCO 2003

Water demand regions in the world. Scenario 2000 - 2050



Source: The Environmental Outlook Baseline. OCDE

Water regulation in the World

- There are approximately **40,000 large dams**.

Storage capacity and robustness of a country or region:

- California: 850 days
- Spain (average): 65 days

How will influence the impact of climate change be?

- **Irrigation:** 20% of the cultivated area is irrigated. More than 300 million ha. and about 40% of the food supply in the world. It uses around 75% of available water.
- **Hydropower:** 20% is generated by water and is only 7% of the global potential.

Electrical energy for irrigation

- Electricity consumption in agricultural sector is a major cost of production and increasing nowadays
- In the Spanish case, irrigation energy represents about 2% of the total consumption and contracted power.
- Consumption, and consequently the energy costs are increasing as a result of irrigation modernization effort being made by the Irrigators Communities going from gravity irrigation system to irrigation pressure (dripping and sprinkling).
- Increased energy cost for double way:
 - a) *greater power consumption (irrigation pressurized net)*
 - b) *Difficulty in adjusting to tariff system*

Changes in water and energy use for irrigation

Year	Water used (m ³ /ha)	Energy used (KWh/ha)
1950	8250	206
1970	8000	480
1980	7750	775
1990	7500	1088
2000	7000	1435
2007	6500	1560
Increase (%)	-21	657

Source: Corominas (2009)

Challenges of sustainable irrigation

1. Feed a growing world population
2. Reducing rural poverty existing in the world
3. Reply to expected increase on the management of the availability of natural resources

Limitations:

- Less arable land and less fresh water per capita in the world
- New farming methods and practices based on emitting less CO₂ and methane.

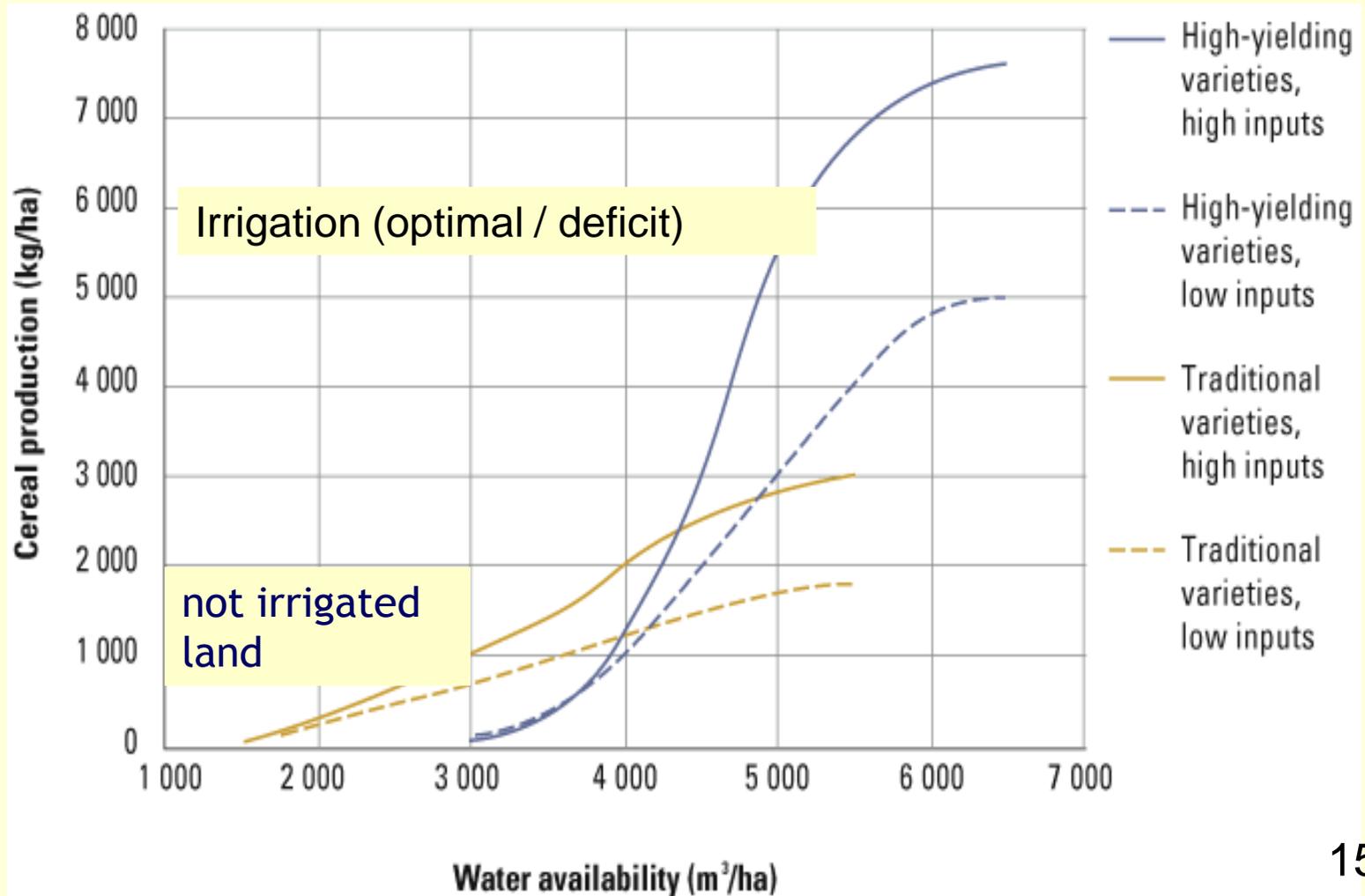
Food demand

Increases of water demand can be satisfied in three ways:

- Raising agricultural productivity. 69%
- Increasing arable land. 19%
- Increasing cropping intensity (number of crops per year) .12%

Irrigation contribution to food security

Crop varieties, fertilizer and water availability, NRLW, FAO 2008



Irrigation contribution to food security



Drought effect in not irrigated lands



Control of soil moisture on well irrigated lands

IRRIGATION EFFECTS

(SOCIAL - ECONOMIC - ENVIRONMENTAL)

- Addition of oxygen to the atmosphere
- Are sinks of atmospheric CO₂
- Producer of raw materials Biofuels
- Reduction of erosion and desertification
- Fixing the population in the territory
- Irrigation as landscape element
- Positive effects on the induced economy by irrigation (GDP)
- Guaranteed of a minimum strategic supply
- Crop diversity and productivity of irrigated areas are higher than in the non-irrigated lands (1 ha S. R. = 5-6)

Conclusions for the sustainability of irrigation

1. Change the wrong picture about the activity of irrigation before the society. Dissemination of the many positive effects of irrigation.
 2. Efficiency in energy consumption and the use of geometric gradients in irrigation: vital for sustainability.
 3. The future modernization of our irrigation will aim efficiency in water and energy nexus, and the possibility of producing renewable energy for self-consumption.
 4. The model of sustainable agriculture must be based on two fundamental principles:
 - *Competitiveness or financial self-sufficient*
 - *"Not aggressive to the environment"*
- multiple profitability: economic, social, environmental and territorial.**
5. Irrigation and biotechnology will be the solution to overcome the challenges of food demand of a growing world population.



Thank you for your attention

Muchas gracias por su atención

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